



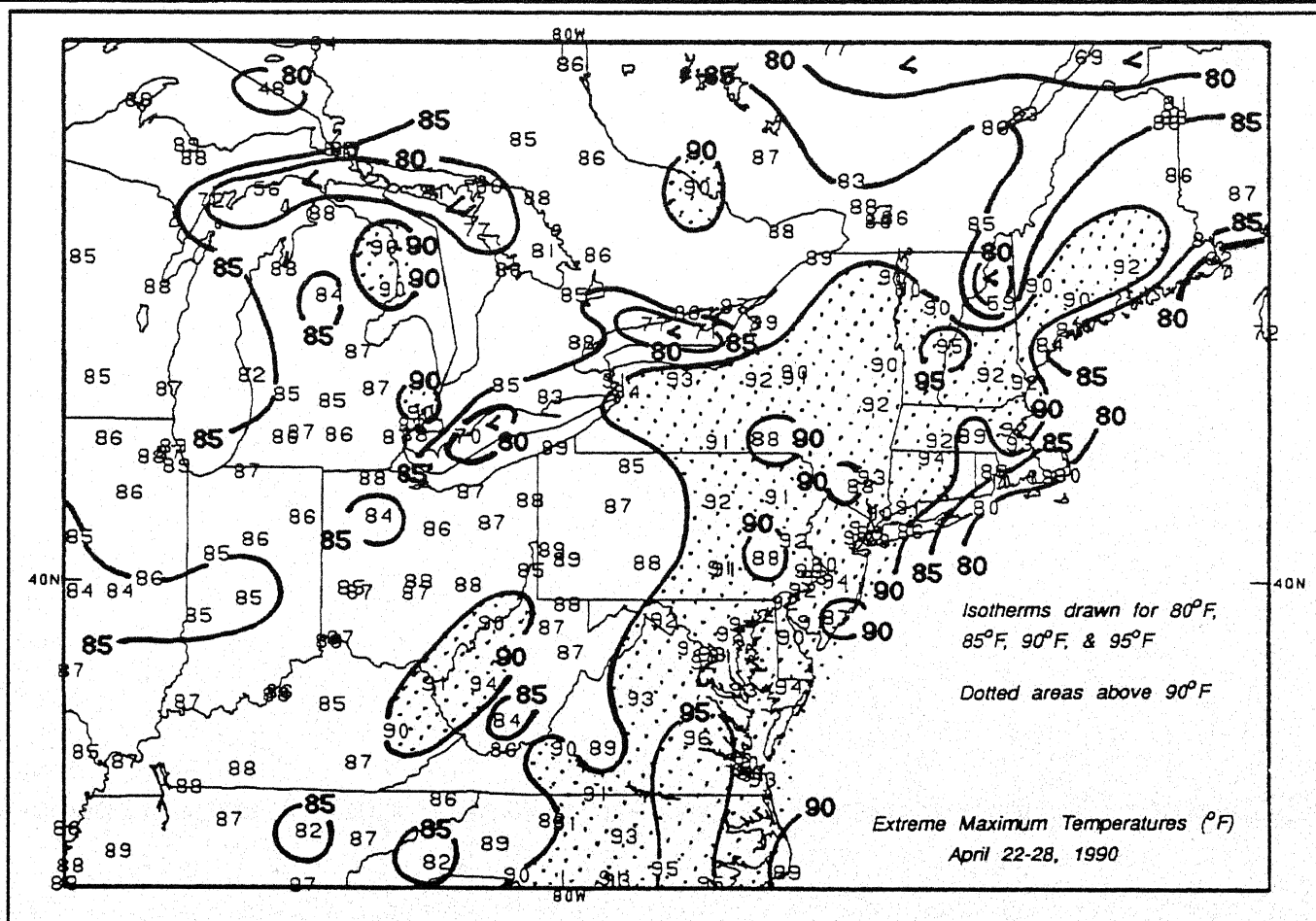
CONTAINS:
SPECIAL ON
HEAVY RAINS
IN TAIWAN AND
SOUTHEASTERN
CHINA.

WEEKLY CLIMATE BULLETIN

No. 90/17

Washington, DC

April 28, 1990



AFTER MUCH OF THE EASTERN HALF OF THE NATION EXPERIENCED COLDER THAN NORMAL CONDITIONS DURING THE PAST FIVE WEEKS, TEMPERATURES MORE TYPICAL OF LATE SUMMER THAN EARLY SPRING SIZZLED THE AREA AS HIGHS IN THE NINETIES WERE COMMON THROUGHOUT THE MID-ATLANTIC AND NEW ENGLAND. FARTHER WEST, SLOW-MOVING THUNDERSTORMS ONCE AGAIN INUNDATED PARTS OF THE SOUTH-CENTRAL GREAT PLAINS WITH UP TO 17.5 INCHES OF RAIN. FOR MORE DETAILS, REFER TO THE U.S. WEEKLY CLIMATE HIGHLIGHTS.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE—NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- U.S. cooling degree days (summer) or heating degree days (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every three months).
- Global three-month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF APRIL 28, 1990

Central United States:

TORRENTIAL DOWNPOURS BATTER PLAINS.

o 279 mm of rain drenched portions of north-central Texas while 100 mm to 200 mm were generally measured from southern Texas to eastern Oklahoma. Severe localized flash flooding occurred as 1 of the precipitation fell rapidly during severe thunderstorms. According to unofficial reports, isolated locations in central Texas were inundated with more than 400 mm of rain within 24 hours. Elsewhere, heavy rains (100 mm to 150 mm) also deluged southern Minnesota while moderate totals (35 mm to 100 mm) were observed throughout the rest of Great Plains and the lower Mississippi Valley [8 weeks].

Western Siberia and Northwestern North America:

EXCEPTIONAL WARMTH RESTRICTED TO ISOLATED LOCATIONS.

Though scattered locations recorded another mild week (with temperatures approaching +7°C in northern Alaska and +13°C in eastern Siberia), temperatures at most locations returned to near normal levels. Widespread, excessive warmth ceased [Ended after 9 weeks].

Central South America:

PERIODS OF ABNORMAL HEAT AFFLICT REGION.

During the past eight weeks, periods of unusually high temperatures have been interspersed with near normal conditions throughout the region. The hot weather has begun to predominate recently, with most stations observing temperatures averaging between 3°C and 7°C above normal [8 weeks].

Coastal Equatorial Africa:

SCATTERED HEAVY RAINS CONTINUE.

Portions of the region received significant relief during the past two weeks, with up to 125 mm of rain reported in portions of Ghana and Ivory Coast. In addition, moderate to heavy rains also dampened portions of southern Mali, Togo, and southern Benin. Unfortunately, the rest of the region remained dry, increasing moisture shortages across affected nations [6 weeks].

Western Saudi Arabia:

RAKISH HEAVY RAINSHOWERS DELUGE REGION.

Thunderstorms infrequently invade Saudi Arabia's typically dry Red

Sea coastline, but meteorological and press reports indicated that localized flash flooding resulted from several days of abnormally heavy rainfall. Up to 225 mm inundated the area, with one location receiving nearly two-thirds of its normal annual rainfall in a few days [Episodic Event].

6. Southern Ethiopia and Somalia, Kenya, Uganda, and northern Tanzania:

HEAVY RAINFALL GENERATES RIVER FLOODING.

Floods across normally arid southern Somalia forced tens of thousands of people from their homes, according to press reports. The flooding occurred from heavy rains across the southern Ethiopia Highland, which caused Somalia's two major rivers to escape their banks in at least thirty places. Additionally, last week's heavy rainfall (up to 152 mm in Kenya) continued the recent trend of occasional moderate to heavy showers that has afflicted the region during recent weeks [8 weeks].

7. Taiwan, Southern Japan, and Southeastern China:

INTENSE RAINFALL AGAIN SOAKS REGION.

Up to 275 mm of rain inundated Taiwan while 50 mm to 150 mm drenched the remainder of the area as the wet spell persisted without a respite. Some of the rain fell quite heavily, dumping as much as 128 mm on southern Japan during one day (see Special Climate Summary) [5 weeks].

8. The Philippines:

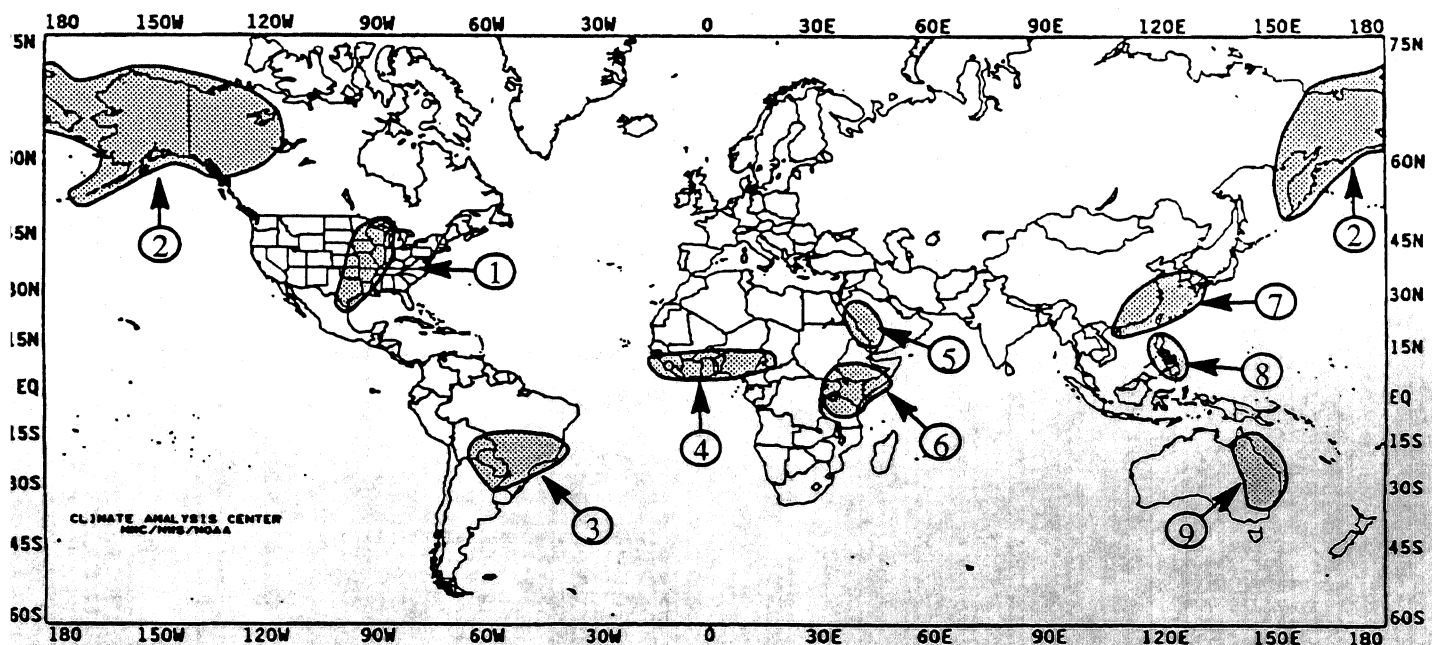
ABNORMALLY DRY WEATHER CREATES SERIOUS MOISTURE DEFICITS.

Persistently below normal precipitation has plagued the country for nearly three months, and press reports indicated that agricultural and hydrological stresses are attaining serious proportions. Last week, 20 mm to 50 mm moistened isolated locations across the southern islands while little or no measurable rain fell farther north [8 weeks].

9. Eastern Australia:

VERY DRY WEATHER EASES FLOODING.

After several weeks of excessive rainfall and widespread flooding, little or no measurable rainfall was recorded across the eastern half of the continent, allowing residents to begin cleaning up from one of their worst floods of this century [Ending after 6 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF APRIL 22 – APRIL 28, 1990

Weather more typical of late summer than early spring occurred across the eastern half of the country while conditions more reminiscent of late winter afflicted the Pacific Northwest and northern Rockies. Readings in the eighties and nineties covered much of the central and eastern U.S., setting dozens of daily minimum temperature records during the week (see front cover). In contrast, much colder air invaded the northwestern quarter of the country as a series of Pacific storms kept much of the area unusually

Late-season snows whitened the Cascades and parts of the Sierra Nevadas, and heavy wet snow fell on portions of the Dakotas, Wyoming, Montana, Idaho, Utah, and Colorado. Meanwhile, in the coniferous midsection, a slow-moving storm system triggered intense thunderstorms from Texas northward into Minnesota, producing numerous severe weather outbreaks including torrential rainfalls, damaging winds, large hail, and several tornadoes. One of the thunderstorms in the south-central Great Plains dropped tremendous amounts of rain in a very short time period, creating localized flash flooding. For example, DeLeon, TX recorded 17.5 inches of rain within 24 hours (between April 25–26). In Brownwood, TX measured over 16 inches. In addition, heavy rains have inundated southeastern Oklahoma with more than 10 inches during the past two weeks, causing several rivers and streams to overflow their banks (see Figure 1).

Early in the week, a southward advancing cold front triggered heavy thunderstorms in the Southeast while a storm system brought reasonable rainfall to northern California and the Pacific Northwest Coast. Very warm weather prevailed in the northern Plains as highs topped 90°F in the Dakotas. An upper-level trough and low pressure generated scattered strong thunderstorms in the coniferous midsection.

During mid-week, severe weather broke out from the southern Great Plains northward into the upper Midwest. Large hail, along with a few tornadoes, hit sections of Texas and Oklahoma. Farther north, southeastern Minnesota received between 3 and 6 inches of rain on Monday evening and Tuesday morning. Summer-like readings in the eighties and nineties pushed eastward into the Midwest and Northeast while a cold front slowly crept eastwards out of the Rockies towards the Plains. Unsettled weather continued in the Far West as another Pacific storm system approached the Washington and Oregon coasts.

Toward the week's end, a strong ridge of high pressure anchored along the Atlantic Coast kept the East warm and dry while blocking the eastward progression of the cold front in the central U.S. As a result, widespread thunderstorm activity continually

battered the south-central Great Plains, dumping copious amounts of rainfall on the area. Farther north, Canadian air penetrated into the northern Rockies and Plains, plunging temperatures below freezing and producing heavy snows in Wyoming and the Dakotas. By Saturday, the cold front finally began pushing eastward, and intense thunderstorms developed in the Southeast and Midwest. The second Pacific storm system tracked southeastward into the central Rockies and intensified, generating precipitation throughout much of the West.

According to the River Forecast Centers, the greatest weekly precipitation totals (more than 5 inches), in addition to the localized heavy rainfall in north-central Texas (e.g. DeLeon and Brownwood, TX), were recorded in the south-central Great Plains and southeastern Minnesota (see Table 1). A large swath of the central U.S., from southern Texas northeastward to northern Wisconsin, accumulated over 2 inches of precipitation during the week. Portions of the lower Mississippi and western Tennessee Valleys received heavy rainfall, while scattered locations in western Wyoming, northern Utah, central Colorado, and along the Pacific Northwest Coast similarly reported moderate to heavy precipitation totals.

Light to moderate amounts were observed throughout the remainder of the country with the exception of the desert Southwest, the extreme southern Rockies and High Plains, the central and lower Great Lakes, the mid-Atlantic, and along the New England and eastern Florida Coasts, where little or no precipitation occurred. Much of Alaska and Hawaii was relatively dry, although Hilo, HI experienced heavy rain showers.

Five successive weeks of subnormal temperatures abruptly came to an end in the eastern half of the nation as extremely warm weather pushed highs into the eighties and nineties as far north as northern parts of Michigan and Maine and produced weekly departures exceeding +16°F in the Great Lakes region (see Table 2). With the exception of the northwestern U.S. and eastern Florida, temperatures across the rest of the nation averaged above normal. Similarly, Alaska and Hawaii observed slightly warmer than usual conditions.

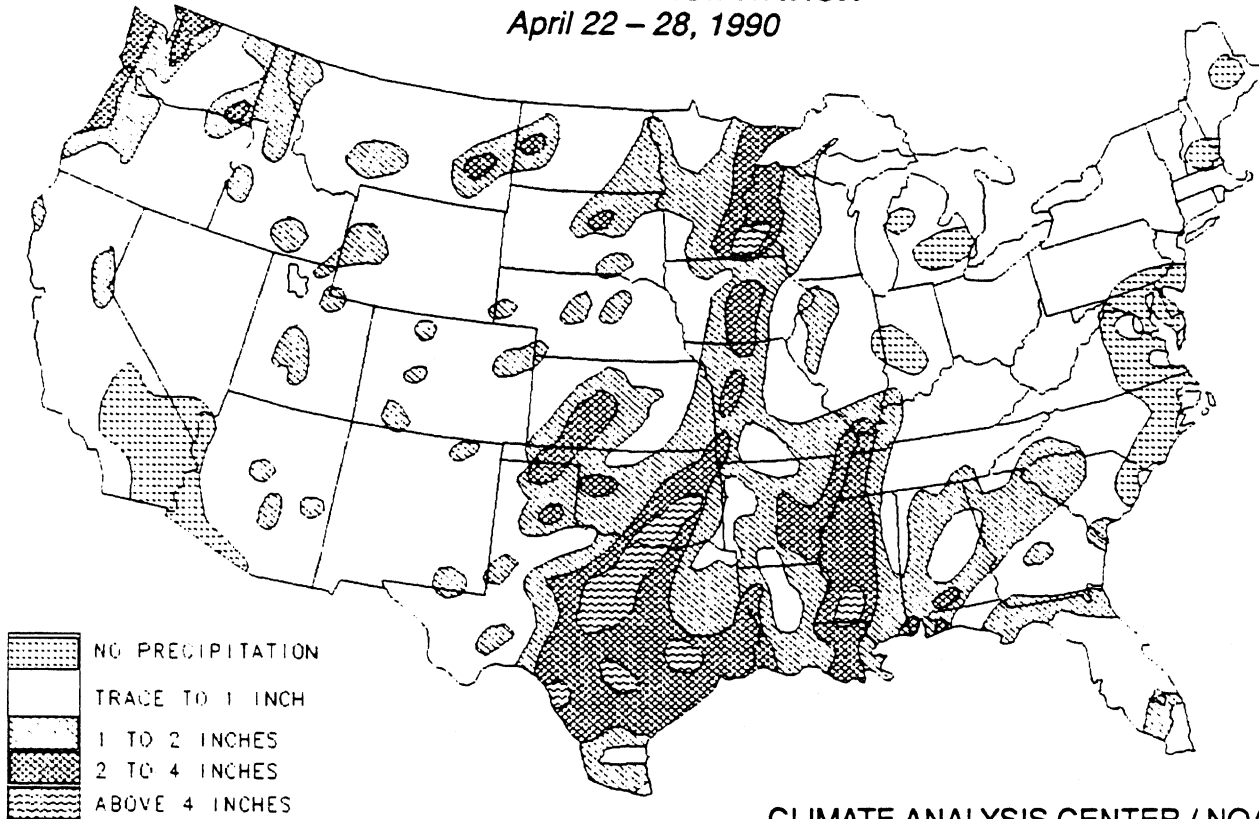
Subnormal weekly temperatures were limited to the Pacific Northwest, the northern thirds of the Intermountain West and Rockies, and along the extreme southern Atlantic Coast (see Table 3). Sub-freezing temperatures were generally confined to the northern Intermountain West, but as colder air invaded the north-central U.S. late in the week, lows dipped near 20°F in North Dakota and Wyoming.

TABLE 1. Selected stations with 2.75 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
MCALISTER, OK	5.27	PALACIOS, TX	3.40
ROCHESTER, MN	5.26	DODGE CITY, KS	3.38
MCCOMB, MS	5.20	BLYTHEVILLE AFB, AR	3.35
COLLEGE STATION, TX	5.01	QUILLAYUTE, WA	3.26
DALLAS NAS, TX	4.35	HOUSTON/WILLIAM HOBBY, TX	3.18
DEL RIO/LAUGHLIN AFB, TX	4.02	PENSACOLA, FL	3.11
HOUSTON, TX	3.84	BEEVILLE NAS, TX	3.00
PINE BLUFF, AR	3.77	MEMPHIS NAS, TN	2.99
STEPHENVILLE, TX	3.73	DALLAS-FORT WORTH, TX	2.97
SAN ANTONIO, TX	3.69	LITTLE ROCK AFB, AR	2.87
ASTORIA, OR	3.59	KILLEEN/ROBERT GRAY AAF, TX	2.83
PORT ARTHUR, TX	3.45	SAN ANTONIO/RANDOLPH AFB, TX	2.83

OBSERVED PRECIPITATION

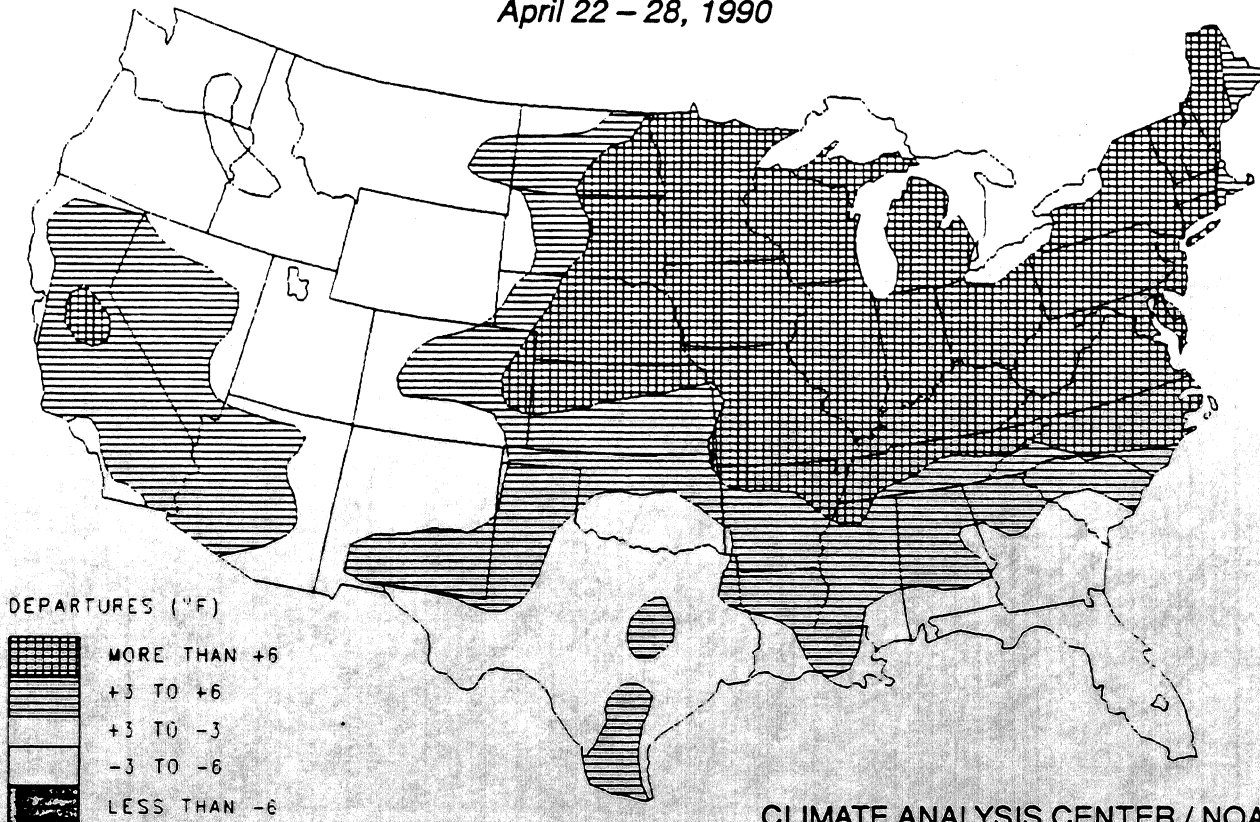
April 22 - 28, 1990



CLIMATE ANALYSIS CENTER / NOAA

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

April 22 - 28, 1990



CLIMATE ANALYSIS CENTER / NOAA

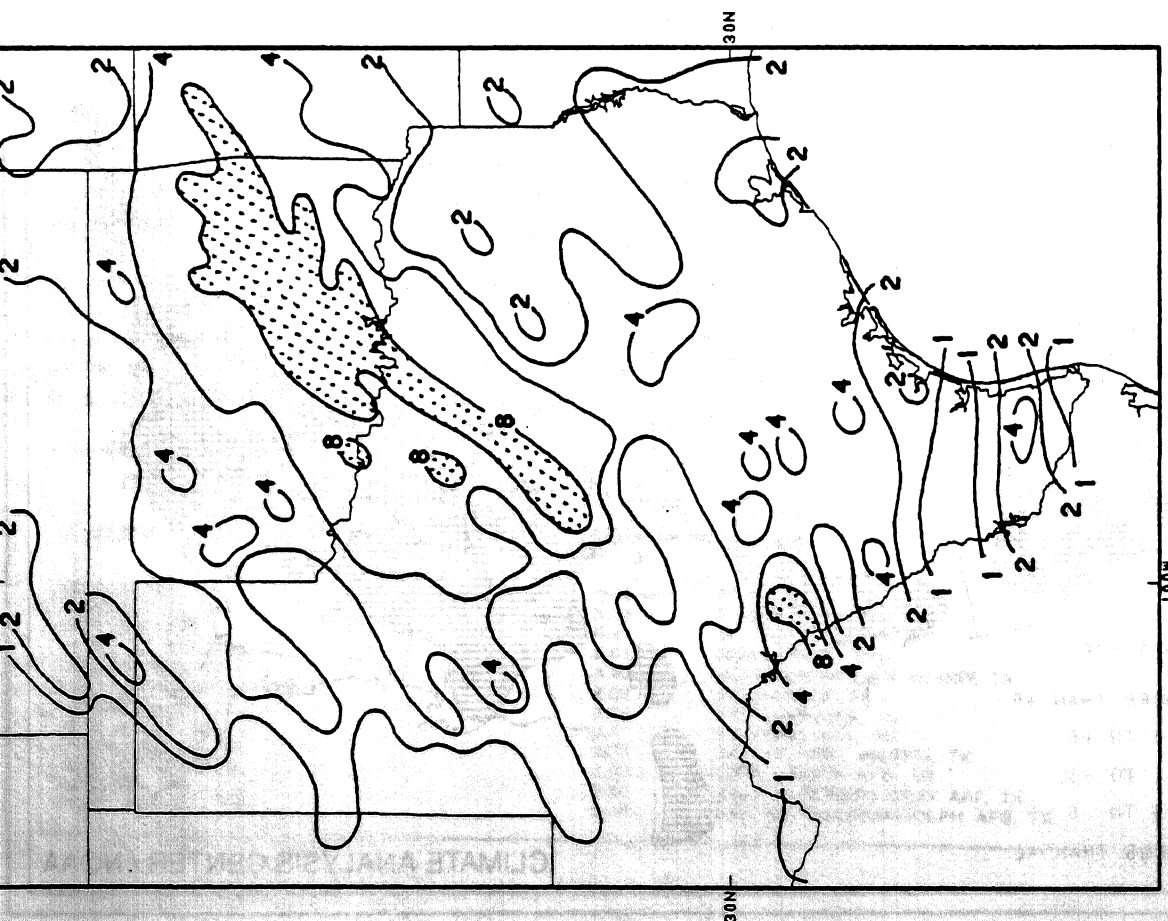


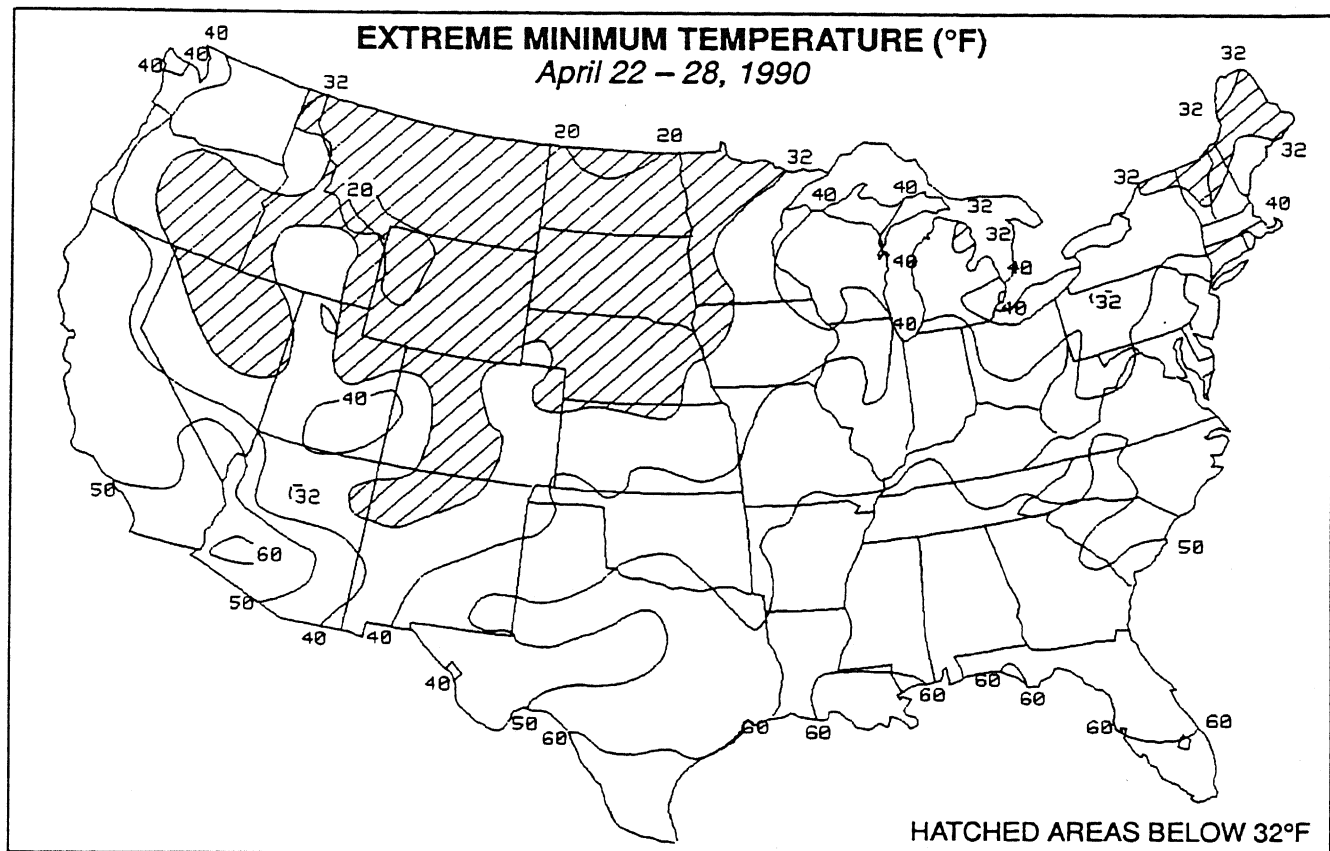
Figure 1. Total precipitation (inches) during April 15-28, 1990, based upon first-order synoptic, airways, and the River Forecast Centers stations. Isohyets are only drawn for 1, 2, 4, and 8 inches, and stippled areas are more than 4 inches. Last week, strong thunderstorms dumped up to 17.5 of rain on DeLeon, TX within a 24-hour period (between April 25-26) while Brownwood, TX received 16.05 inches, producing severe flash flooding. Heavy rains have also fallen on much of the south-central Great Plains during the past two weeks as many locations in north-central Texas and southeastern Oklahoma have measured between 8 and 12 inches of precipitation since April 15.

TABLE 2. Selected stations with temperatures averaging 16.0°F or more ABOVE normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MARQUETTE, MI	+26.1	68.0	EAU CLAIRE, WI	+17.6	66.9
TRAVERSE CITY, MI	+22.7	69.2	GRAND RAPIDS, MI	+17.1	67.5
PELLISTON, MI	+22.7	66.8	LA CROSSE, WI	+16.6	68.5
HANCOCK/HOUGHTON CO, MI	+22.4	63.8	ERIE, PA	+16.6	65.6
ALPENA, MI	+20.3	65.1	MADISON, WI	+16.5	66.6
GREEN BAY, WI	+20.0	68.0	CHICAGO/OHARE, IL	+16.4	68.6
MILWAUKEE, WI	+19.9	68.1	MT. CLEMENS/SELFIDGE AFB, MI	+16.4	65.9
SAULT STE. MARIE, MI	+19.8	62.1	MUSKEGON, MI	+16.4	65.6
WAUSAU, WI	+19.7	67.6	BINGHAMTON, NY	+16.4	64.6
HOUGHTON LAKE, MI	+19.4	65.7	BRADFORD, PA	+16.4	62.8
PARK FALLS, WI	+19.1	65.0	SOUTH BEND, IN	+16.1	68.4
FLINT, MI	+18.7	68.4	JACKSON, MI	+16.1	67.0
SAGINAW, MI	+18.5	68.4	ROCHESTER, NY	+16.0	65.9
LANSING, MI	+18.3	67.6			

TABLE 3. Selected stations with temperatures averaging 1.8°F or more BELOW normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
STAMPEDE PASS, WA	-4.3	33.1	BOISE, ID	-2.5	48.6
WALLA WALLA, WA	-3.9	51.4	JACKSONVILLE, FL	-2.2	68.8
BAKER, OR	-3.7	43.1	GAINESVILLE, FL	-2.2	69.2
WENATCHEE, WA	-3.7	50.8	BURNS, OR	-1.8	44.1
OGDENHILL AFB, UT	-3.6	48.9	MISSOULA, MT	-1.8	45.1
SEXTON SUMMIT, OR	-3.3	40.7	YAKIMA, WA	-1.8	49.8
SPOKANE, WA	-3.3	45.3	PORTLAND, OR	-1.8	50.4
PENDLETON, OR	-3.0	49.7	KEY WEST, FL	-1.8	76.8

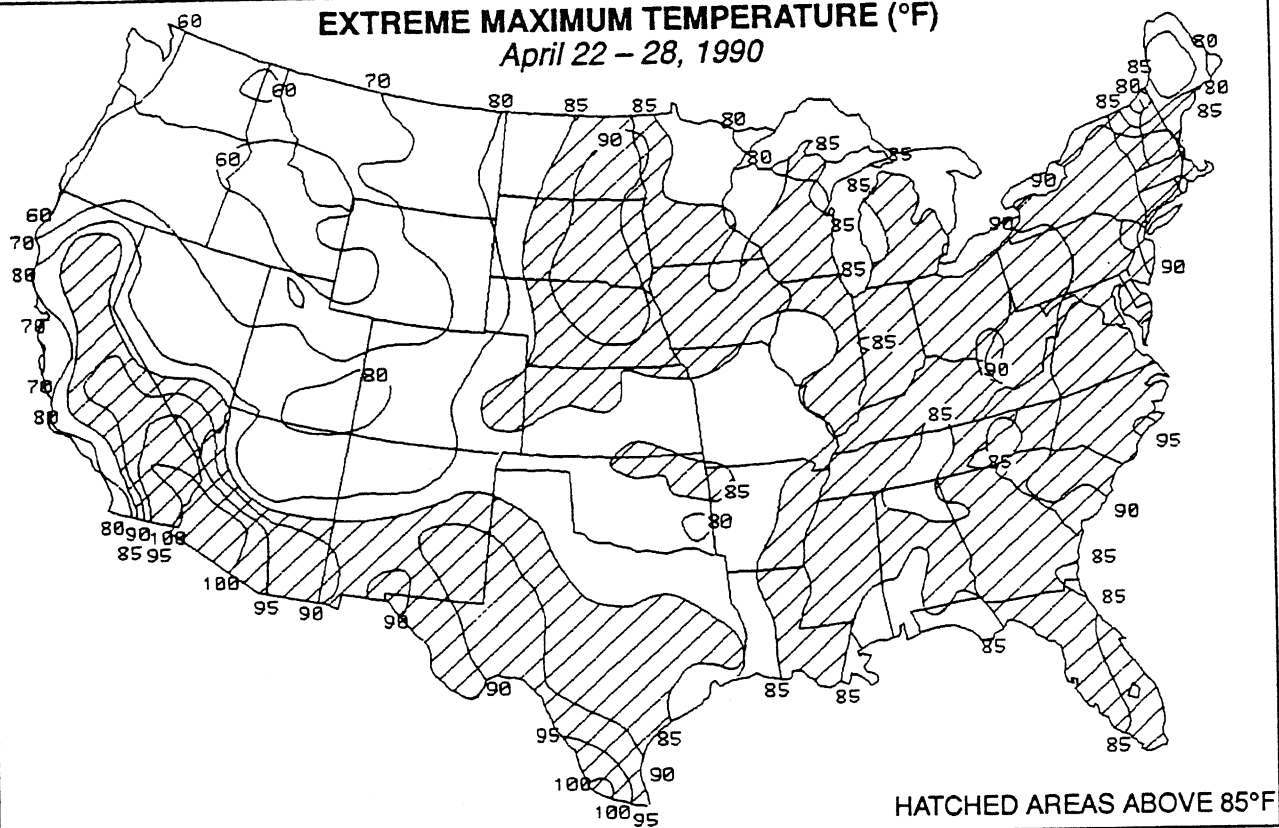


With unseasonably warm conditions in the eastern half of the country, readings below freezing were confined to extreme northern New England. Farther west, however, much colder air dominated the Pacific Northwest and gradually invaded the northern Rockies and Plains towards the week's end, dropping temperatures under 32°F (top) and producing bitterly cold (less than 0°F) wind chills in the latter two regions (bottom).

MINIMUM WIND CHILL (°F)

EXTREME MAXIMUM TEMPERATURE (°F)

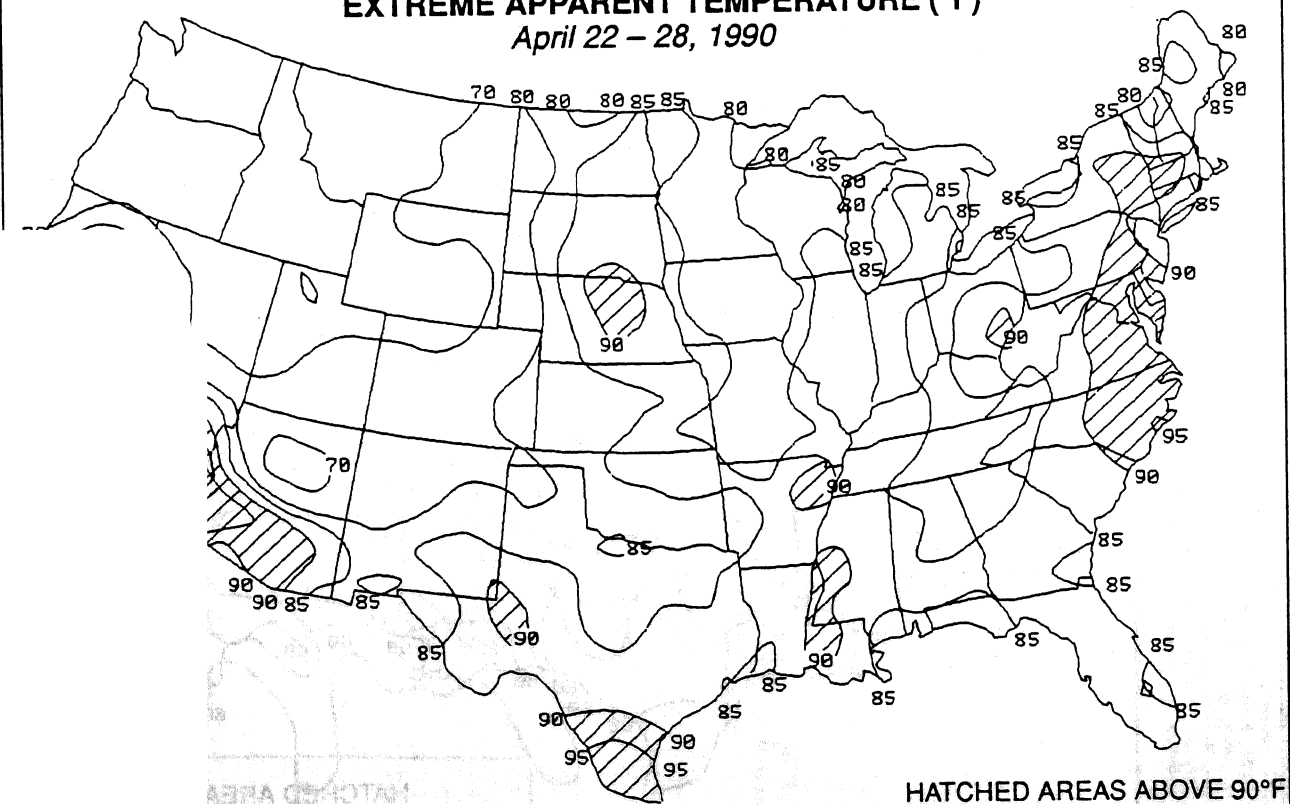
April 22 - 28, 1990



After several weeks of abnormally cold weather, summer-like heat covered the eastern third of the nation with highs in the eighties and nineties. Similarly, southern Texas and the desert Southwest experienced high temperatures but cold air kept readings from rising out of the sixties in the northwestern U.S. (top). Unseasonably hot weather produced apparent temperatures that fell into the extreme caution category (between 90°F - 105°F) along the middle Atlantic Coast states, in southern Texas, and the desert Southwest (bottom).

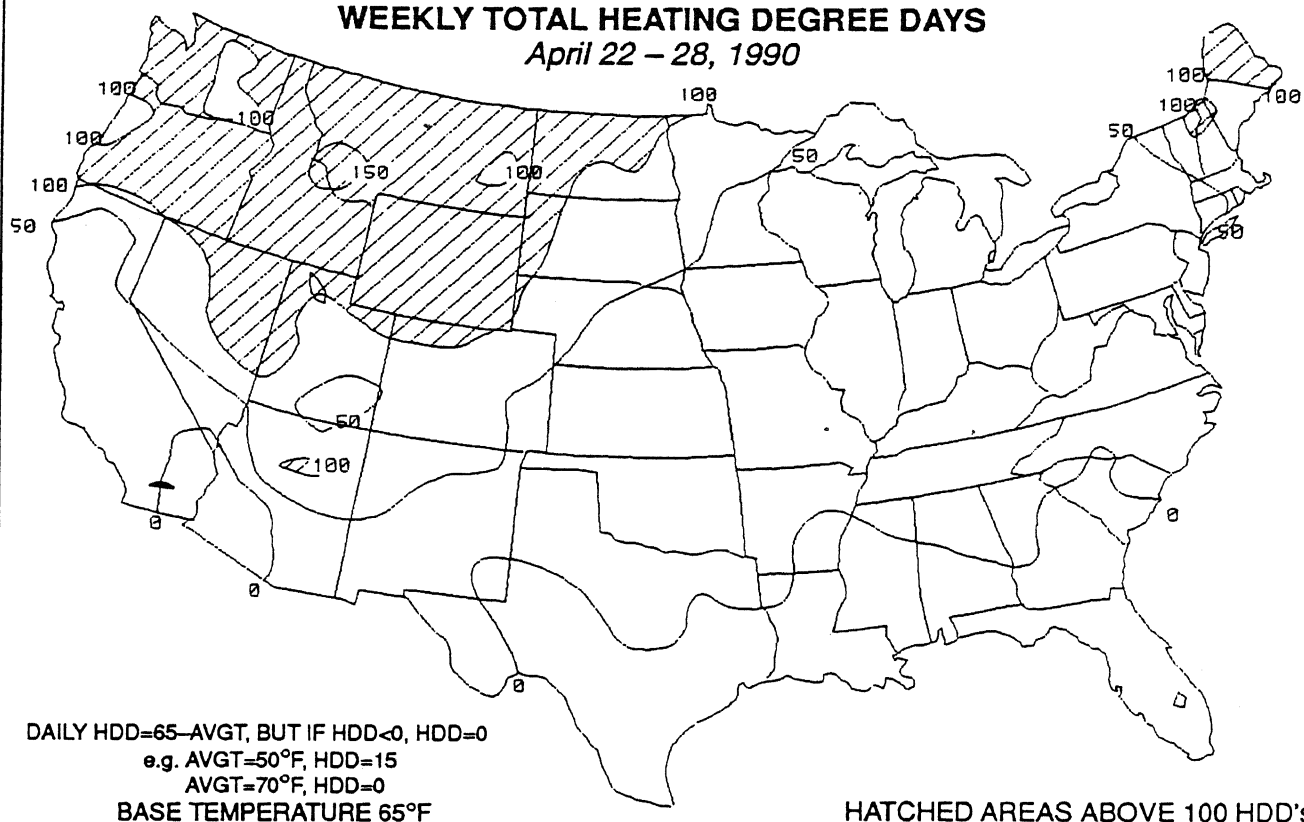
EXTREME APPARENT TEMPERATURE (°F)

April 22 - 28, 1990



WEEKLY TOTAL HEATING DEGREE DAYS

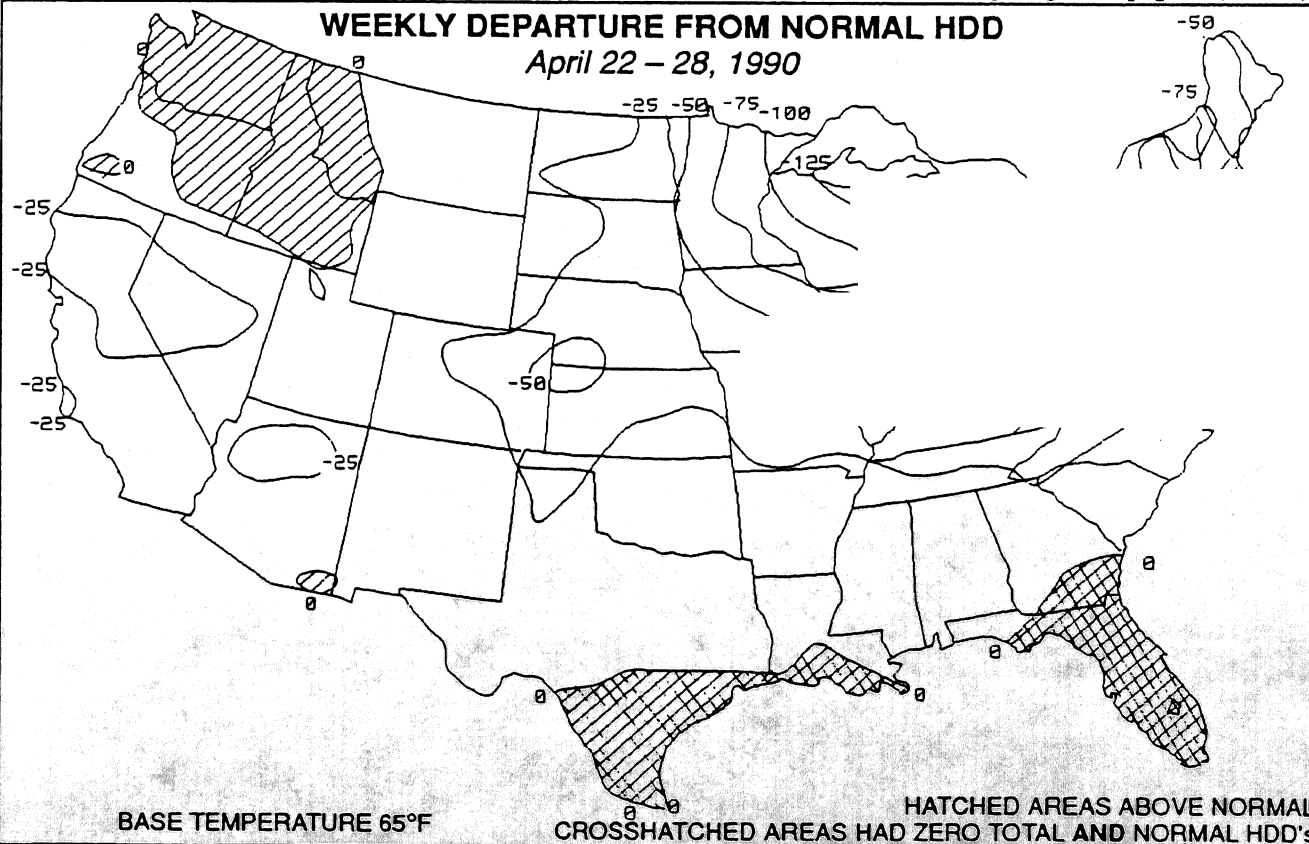
April 22 - 28, 1990



Except for the northwestern quarter of the nation and extreme northern New England, much of the lower 48 states recorded little or no heating requirements due to the unseasonably warm weather and the normal decrease in heating usage during the Spring (top). The greatest negative heating departures occurred in the upper Midwest, Great Lakes, and New England as warm weather not only diminished the heating demand but also required some unexpected cooling usage [see page 8] (bottom).

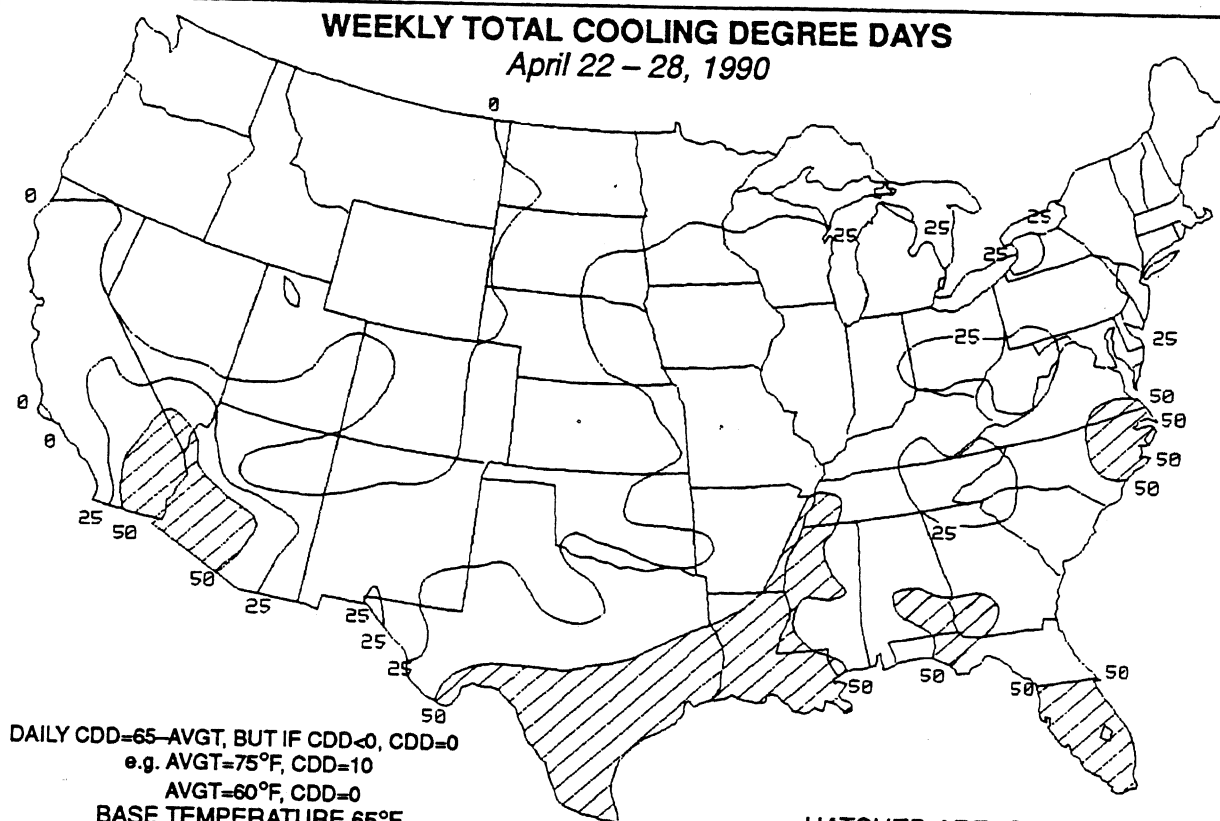
WEEKLY DEPARTURE FROM NORMAL HDD

April 22 - 28, 1990



WEEKLY TOTAL COOLING DEGREE DAYS

April 22 - 28, 1990

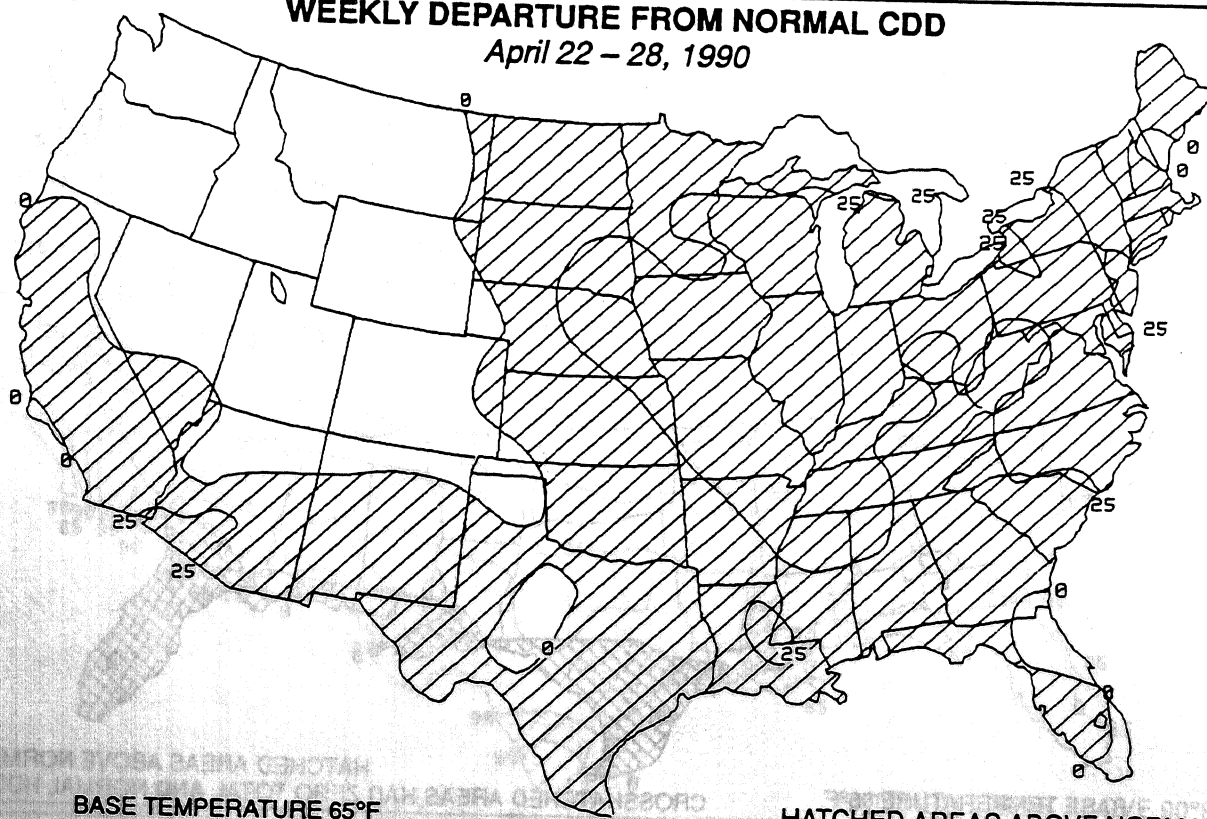


HATCHED AREAS ABOVE 50 CDD's

FIRST CHARTS OF THE SEASON. This week's unusually warm weather generated unexpectedly early air-conditioning usage across the eastern half of the U.S. (top). Almost all but the northwestern quarter of the country, where conditions were colder than usual, experienced above normal air-conditioning demand, particularly throughout the Midwest and mid-Atlantic regions (bottom).

WEEKLY DEPARTURE FROM NORMAL CDD

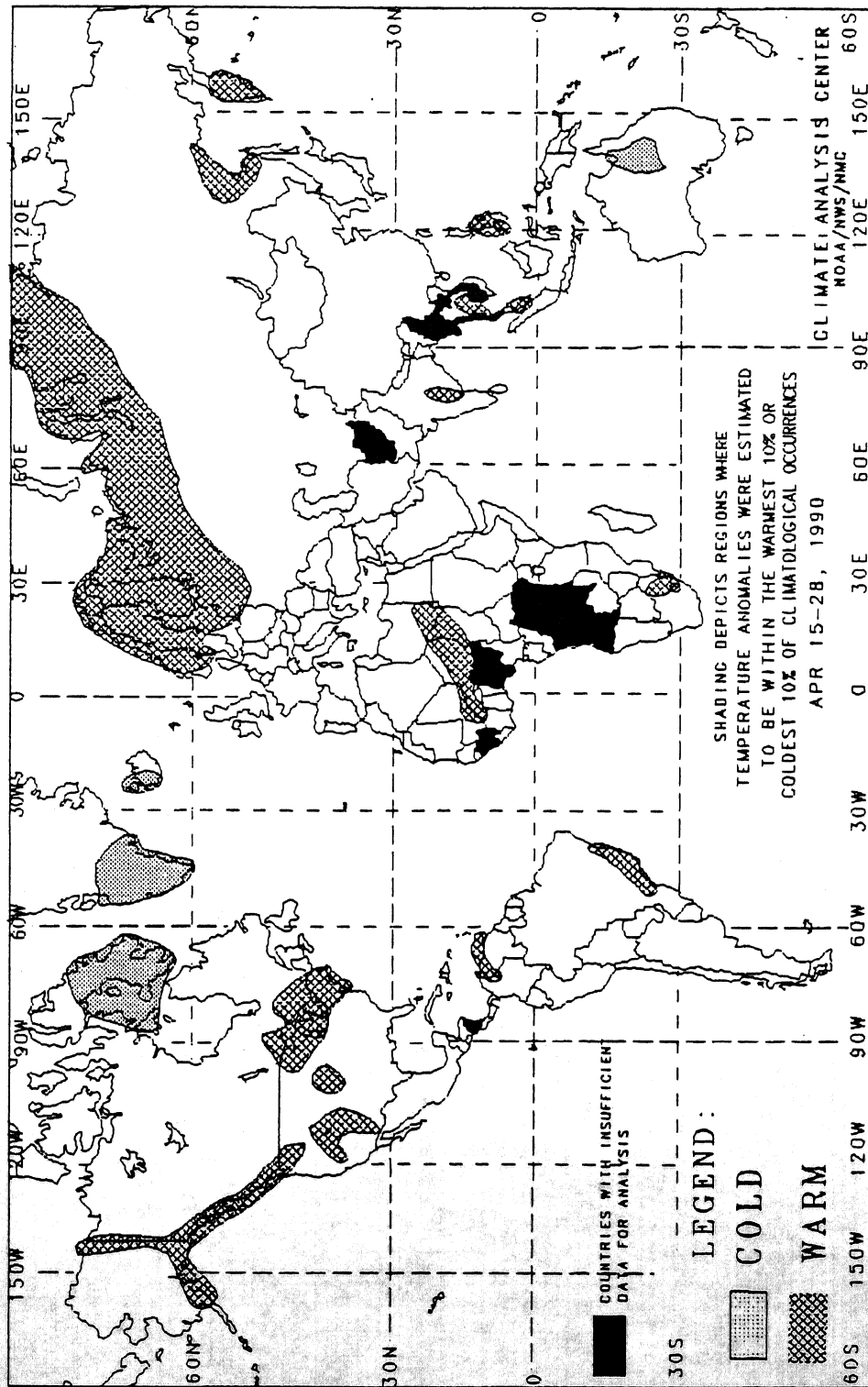
April 22 - 28, 1990



HATCHED AREAS ABOVE NORMAL

GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



Temperature anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

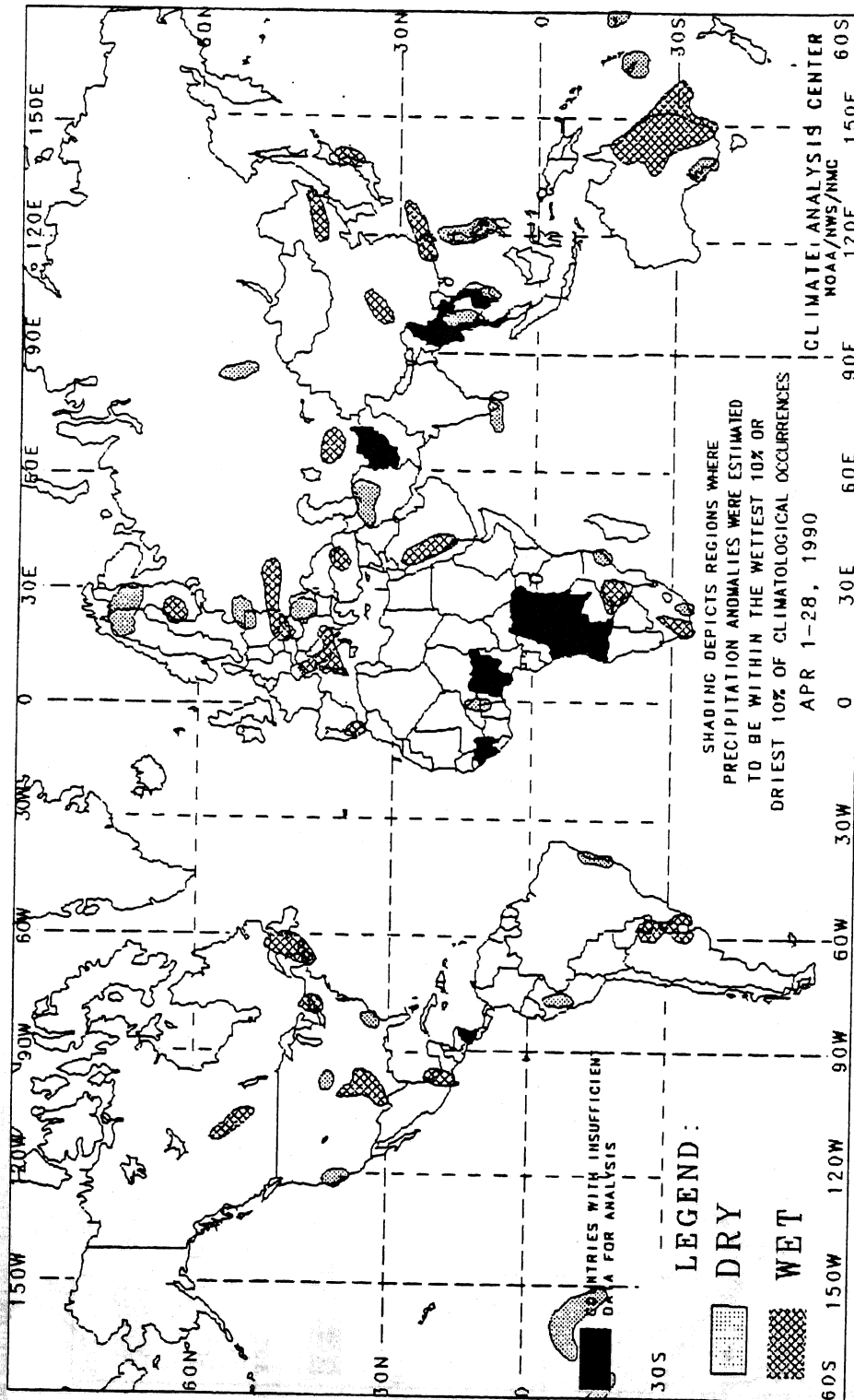
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY
CLIMATE ANALYSIS CENTER, NMC
NATIONAL WEATHER SERVICE, NOAA

TORRENTIAL RAINS SINCE EARLY
APRIL HAVE INUNDATED
SOUTHEASTERN CHINA AND TAIWAN

During the spring months, precipitation normally increases from the winter minimum and reaches a maximum during the summer months, generally from June–August, in southeastern China and most of Taiwan. This spring, however, the rainy season has gotten off to a quick start throughout much of the region as heavy rains have soaked most of southeastern China, specifically eastern Guangdong and southern Fujian provinces, and much of Taiwan, especially the central portion of the island.

During the past three weeks, more than 200 mm of rain have fallen in the aforementioned Chinese provinces, while nearly 1000 mm have inundated central Taiwan (see Table 1). Earlier this year, abnormally heavy rains also occurred in southeastern China during the latter half of February and again during late March.

Since April 8, more than twice the normal rainfall was recorded in eastern Guangdong and southern Fujian provinces while the western two-thirds of Taiwan received over four times the usual amount (see Figure 2). Surplus rainfall during the past three weeks ranged from 100 mm in parts of Guangdong and Fujian provinces up to 835 mm in central Taiwan (see Figure 3).

According to the China News Service (CNS), more than 200,000 acres of rice, vegetable, and other agricultural fields were flooded by the torrential rains in Fujian province alone. Officials had received more than 300 reports of roads blocked by flooding. Although press reports for Taiwan were not available, the heavy rains most likely caused severe flooding and property damage to central and western sections of the island.

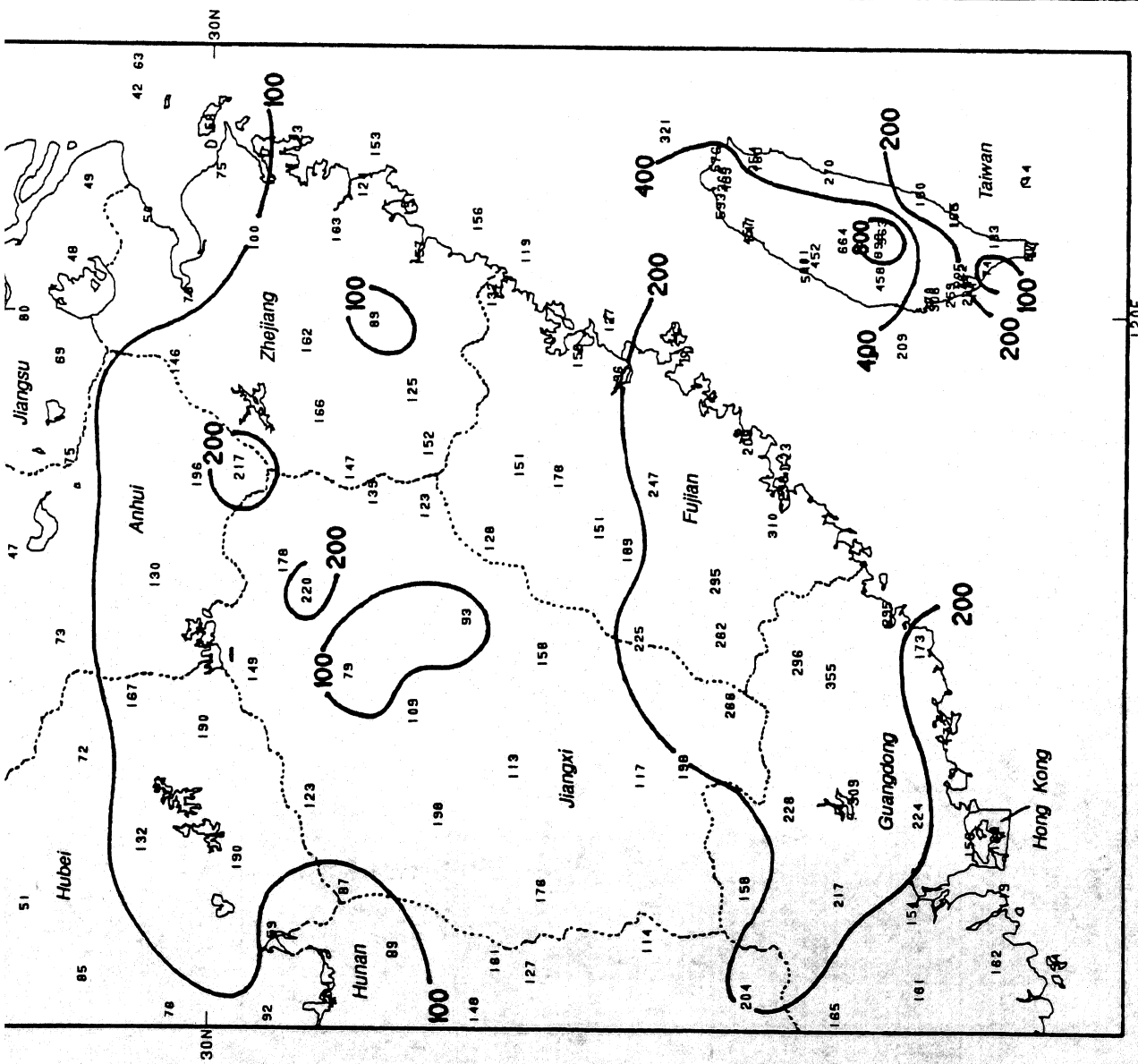


Figure 1. Total precipitation (mm) during April 8-28, 1990 (21 days). A station required 90% (18 days) or more of the days for inclusion. Isohyets are only drawn for 100, 200, 400, and 800 mm. Heavy rains have deluged most of Taiwan and southeastern China, especially Guangdong and Fujian provinces, with more than 200 mm during the past 3 weeks. In Taiwan, nearly 1000 mm of rain have inundated the central portions of the island since early April. Surplus precipitation also occurred in the region during mid-to late February and late March.

